Quick Response (QR) Code Based Just-in-time Training Platform for Seldom Used Anesthesia Equipment

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Problem Definition

- As Thomas Jefferson University Hospital (TJUH) system experiences a shift in surgical case load to a more critically ill patient population requiring complex surgical intervention, The Department of Anesthesiology must demonstrate agility in how learners are trained on equipment to ensure safe and timely patient care
- Currently no systemic database serves as a self access, self guided platform for both continuing education and/or onboarding.
- Lack of equipment training can negatively impact patient safety due to incorrect equipment use or settings
- Compared to other patient safety incidents, incorrect use or settings are more likely to be associated with patient harm
- In one study, of 12,084 patient incident reports in intensive care units involving patient safety, 8.5% were associated with use of equipment, and almost 2% with incorrect settings or use of equipment[1]
- Pre-intervention baseline data:
  - Awareness of training process at TJUH was 12%
  - Knowledge of where to find information was 9%
  - Rates of staff having never practiced setting up critical, seldom used pieces of equipment as much as 60%
  - 75% felt unprepared or unfamiliar with clinical equipment

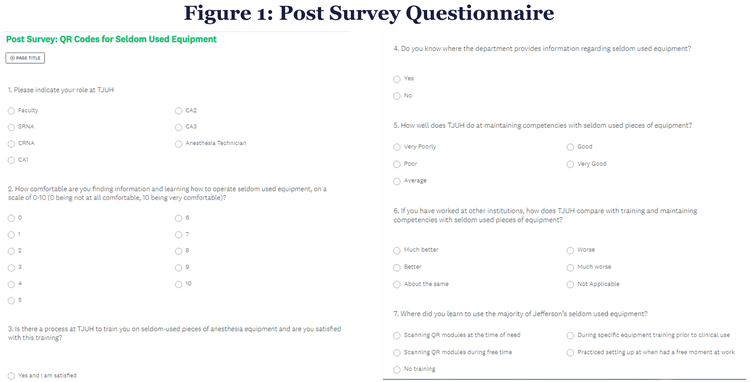
Aim For Improvement

- This quality improvement initiative aims to introduce, improve, and maintain proficiency with seldom used critical pieces of anesthesia equipment prior to use in emergent clinical situations through the following
  - Provide just-in-time usage instructions through smartphone technology
  - Remove barriers that lead to unfamiliarity with rarely used equipment, we hope to reduce patient safety incidents due to improper usage
- The aim was to improve the department's familiarity and self-reported competence with seldom used equipment by at least 50%

Intervention

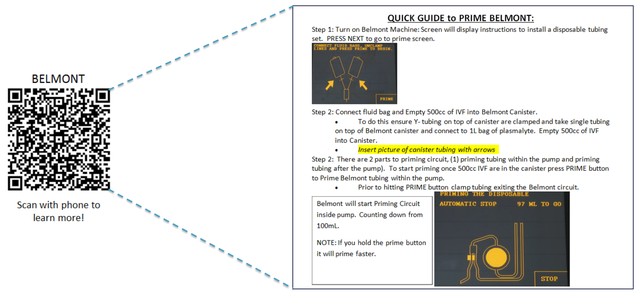
- Prior to implementation, a pre-intervention survey was conducted that collected the following baseline metrics
  - Comfort and familiarity with equipment
  - Ability to independently use and set up equipment
  - Source training for equipment

Figure 1: Post Survey Questionnaire



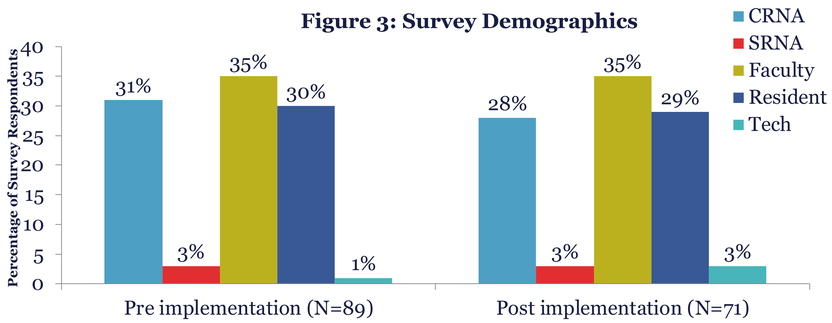
Intervention (Cont.)

Figure 2: Example QR code and Training Module



- The team then developed training modules with essential, need-to-know information that can be absorbed in under 5 minutes
  - Modules consisted of text, photographs, and videos, the modules contain critical information for advance learning (Figure 2)
- These modules were then associated with printed QR codes attached to individual equipment, allowing staff to scan and view them within seconds on any smartphone
- Upon development modules were required training for onboarding new hires or training junior residents
- After implementation of the training platform, a post-intervention survey assessed improvements in familiarity and comfort with equipment use and training

Figure 3: Survey Demographics

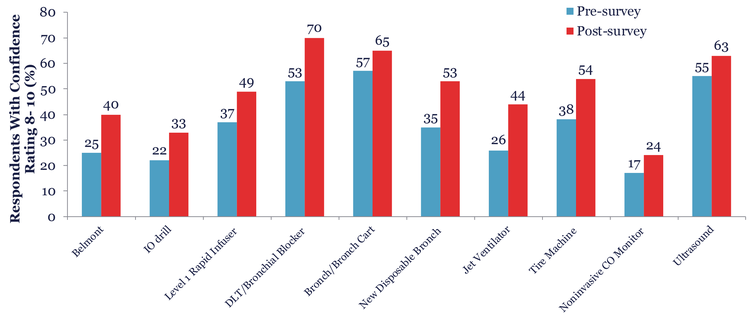


Measurement and Results

- Survey results measured an improved awareness of equipment training process at TJUH (12% pre vs 62% post implementation) and increased knowledge of where to locate information (9% pre vs 58% post)
  - Additionally, improvement in staff perception of TJUH's maintaining competencies with anesthesia equipment, and an improvement in comfort with learning how to operate seldom used equipment
- Prior to implementation 87 % of survey respondents stated they were not aware of a process for training on seldom used pieces of anesthesia equipment, compared to 37% after QI implementation
  - 91% pre vs 43% post implementation did not know where the department provides information regarding seldom used equipment
- Survey results also show a reduction in staff that have never practiced setting up seldom used equipment (eg Belmont 53% pre vs 33% post, disposable bronchoscope 63% pre vs 46% post)

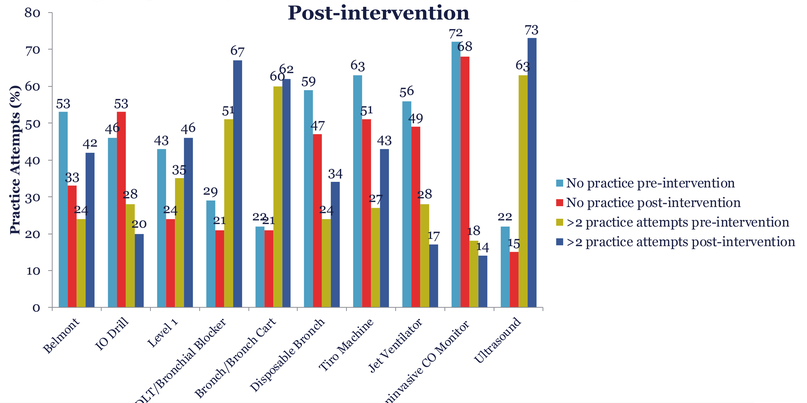
Measurement and Results (Cont.)

Figure 4: High Confidence Rating (8-10) Pre- vs. Post-intervention



- The average change in confidence ratings with equipment was a 13 point increase (Figure 4)
- Survey respondents rating TJUH efforts at maintaining competencies with seldom used equipment as "poor or very poor" improved from 58% pre-intervention to 37% post-intervention
- Comfortable finding information/learning how to operate seldom used equipment improved from 5.8 to 6.25 (weighed average, 0-10 scale)

Figure 5: Rarely Used Equipment Practice Attempts Pre- vs. Post-intervention



Next Steps and Lessons Learned

- This project aims to develop an effective, sustainable equipment education platform based on performance improvement methodology that ultimately helps prepare anesthesia clinicians to consistently deliver safe and effective care for patients
- The results of the post-implementation study indicate an improvement in familiarity, competency, and preparedness for seldom used critical equipment which suggests major strides in achieving this goal
- Building on this success, we will utilize this platform to train junior anesthesia residents prior to starting overnight call, as well as part of onboarding process for new hires

Reference

1. Thomas, A. N., and I. Galvin. *Anaesthesia*. 2008;63(11):1193-1197.